

# 2023

## Dowlake EDFA Production List



- POP1025(M) *SmartGAIN*<sup>TM</sup> WDM EDFA
- POP1021 *SmartAMPLET*<sup>TM</sup> and POP1021 *SmartGAIN*<sup>TM</sup>
- POP1040 *SmartAMPLET*<sup>TM</sup>
- COM1040 *VeriGAIN*<sup>TM</sup> Amplet block
- COAT-RA Optical Fibre Amplifier With RA Chassis
- ASE-BBS *SmartAMPLET*<sup>TM</sup> Broadband Source

  
MICROSYSTEMS



サンインストルメント株式会社

| Up to 26dBm output power VGOA

| Intelligent Electronic Control Built-in

| Fast Transient Suppression for Receiver Protection

*Dowslake SmartGAIN™* WDM EDFA model POP1025(M) is designed specifically for intelligent WDM optical systems. *SmartGAIN* integrates high power pump lasers, variable attenuators, provides the same reliable amplification as our previous products while adding unprecedented flexibility in gain control, tilt control and dispersion compensator control, allowing the same module to be used in different transmission systems.

Intelligence and versatility are the main features of *SmartGAIN*. User can set different gain without suffering from gain tilt, can also automatically obtain best performance while combining *SmartGAIN* with DCM



## Optical Specifications

Parameter		Min.	Typ.	Max.	Unit
Wavelength Range(Custom)	C-Band	1527		1567	nm
	L-Band	1570		1608	nm
Maximum Output Power (POP1025M)				26	dBm
Maximum Output Power (POP1025)				26	dBm
Input Power Range		-29		7	dBm
Variable Gain Range		13		33	dB
Flat Gain Range (to be specified)		10		15	dB
Gain Flatness			±0.5	±1.0	dB
Signal-spontaneous Noise Figure			5	6	dB
Optical Return Loss (at All Ports)		30			dB
Polarization Mode Dispersion			0.3	0.5	ps
Polarization Dependent Gain			±0.2	±0.5	dB
Signal Input & Output Detection Dynamic Range		25	30		
Signal Detection Accuracy (Within the Range)			±0.3	±0.5	
Transient Overshoot (15 dB Drop)			0.5	1	dB
Transient Settling Time				1	ms

### Features:

- Gain Flattened for WDM
- Gain Variable
- Up to 26dBm output power
- Output Tilt Controlled
- C or L Band
- Variable Mid-stage Loss
- Supervisory Channel Add/Drop
- Input and Output Monitoring Taps
- Transient Suppressed

## Operating Environment

Parameter	Min.	Typ.	Max.	Unit
Operating Temperature	-5		+65	°C
Operating Relative Humidity	5		85	%RH
Power Supply Voltage	4.75		5.25	Volt
Power Supply Current			7	A
Power Consumption			35	W
Control	RS232			

## Mechanical Specifications

Model	Parameter	
POP1025M	Electrical Connector	50 PIN (ZLTMM-125-73-G-D)
	Dimensions (H x W x D) without heatsink	130 x 100 x 15 (mm).
POP1025	Electrical Connector	50 PIN (ZSS-125-03-S-D)
	Dimensions (H x W x D) without heatsink	200 x 100 x 31 (mm).

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## Electrical Specifications for I/O PINs

Parameter	Min	Max	Unit	Note
Output High Voltage	3.2		Volt	10uA source current
	2.6		Volt	3mA source current
Output Low Voltage		0.1	Volt	10uA sink current
		0.6	Volt	3mA sink current
Input High Voltage	2.33	5.25	Volt	
Input Low Voltage	0	0.98	Volt	

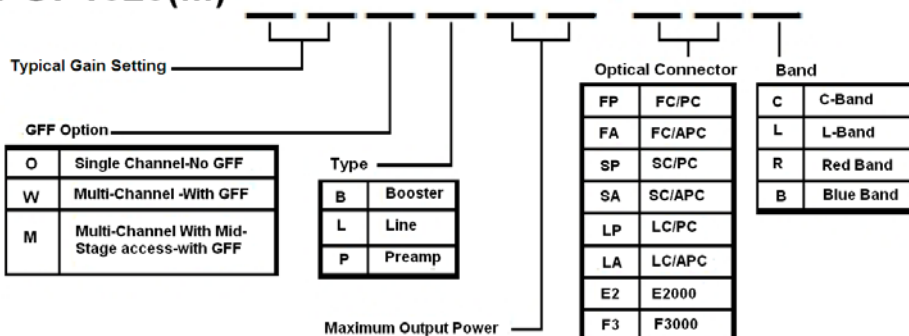
## Pin Assignments

Pin	Description	Pin	Description	Pin	Description	Pin	Description
1	+ 5.0 V	14	RESET Input	27	N/C	40	N/C
2	+ 5.0 V	15	RS-232 In-put, Rx	28	N/C	41	Ground
3	+ 5.0 V	16	RS-232 Out-put, Tx	29	N/C	42	Ground
4	+ 5.0 V	17	Pump Cur-ent Alarm	30	N/C	43	Ground
5	+ 5.0 V	18	Loss of Sig-nal Alarm	31	Ground	44	Ground
6	+ 5.0 V	19	Ground	32	Ground	45	+ 5.0 V
7	Ground	20	Ground	33	Case Tem-perature Alarm	46	+ 5.0 V
8	Ground	21	N/C	34	Loss of Out-put Power Alarm	47	+ 5.0 V
9	Ground	22	N/C	35	Pump Tem-perature Alarm	48	+ 5.0 V
10	Ground	23	N/C	36	N/C	49	+ 5.0 V
11	N/C	24	N/C	37	Shutdown Input	50	+ 5.0 V
12	N/C	25	Ground	38	Eye-safe In-put		
13	Ground	26	Signal Ground	39	N/C		

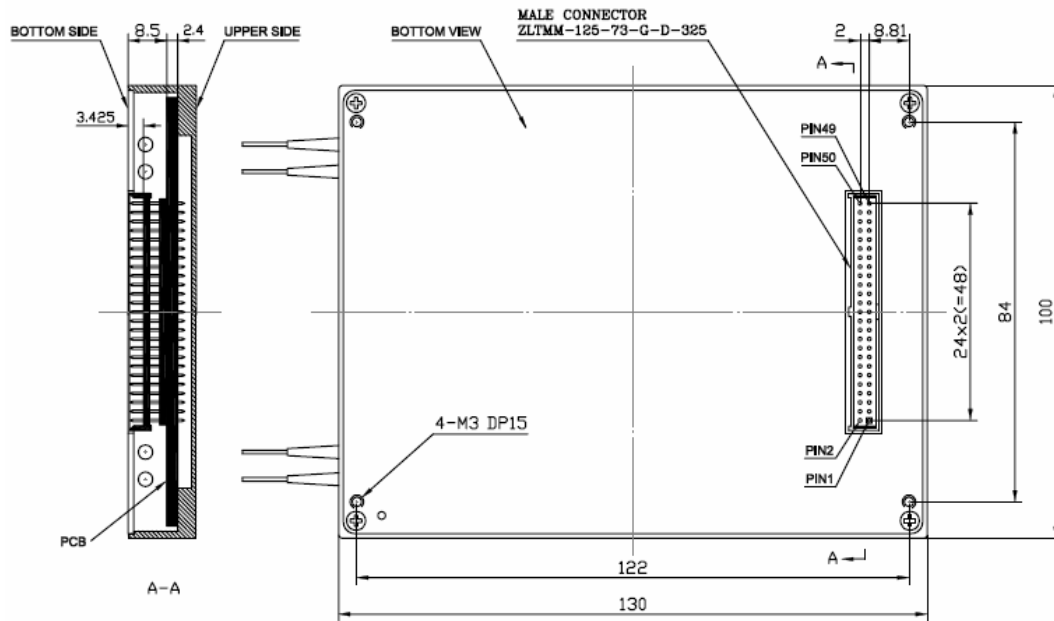


## Ordering Information

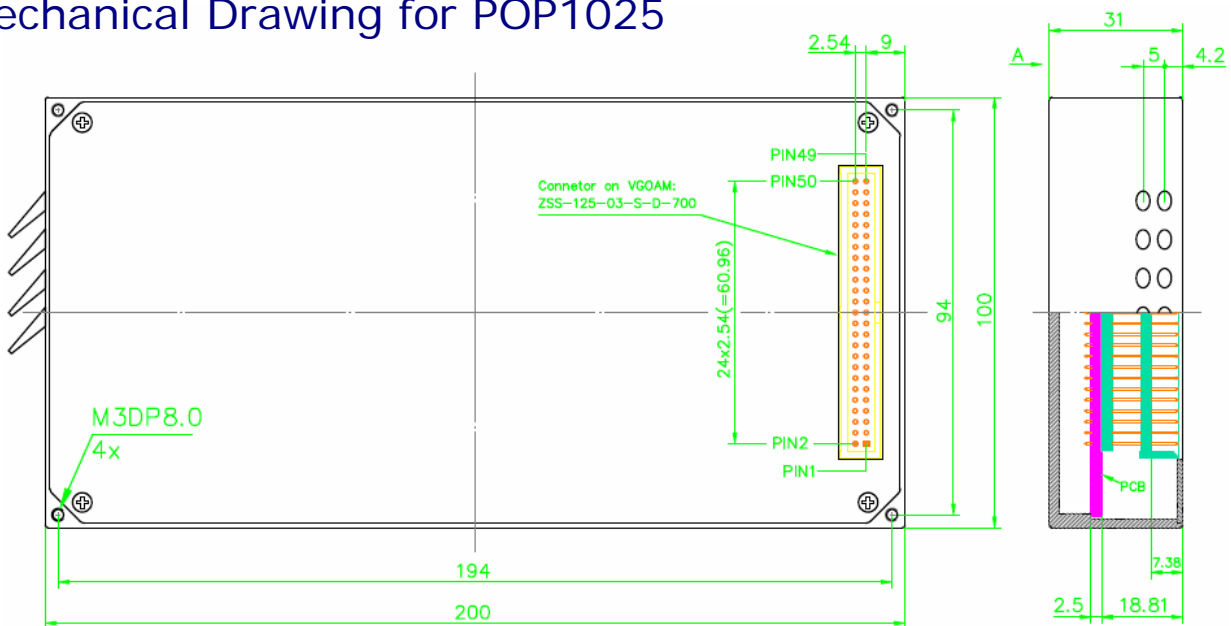
### POP1025(M)-



## Mechanical Drawing for POP1025M



## Mechanical Drawing for POP1025



- | Diversified MSA Size Series
- | Higher Output Power for POP1021 and POP1021C
- | Variable Gain Available for POP1021C
- | Dual Amplifiers in one case for POP1021T
- | All Can be Integrated into COAT Card

*SmartAMPLET*™ POP1021 is Dowlake’s best selling EDFA. Over tens of thousands POP1021s are working in the optical transmission systems. Based on the high quality and reliability of POP1021, Dowlake extended its advantages to a diversified series. Now *SmartAMPLET*™ POP1021 has much higher output power; Two POP1021s can be held in one MSA size housing without any degradation of optical performance.

With higher power of cooled pump, *SmartAMPLET*™ POP1021C can attain higher output power. *SmartGAIN*™ POP1021C is the smallest variable gain optical amplifier in the industry.



## Comparison of Models

Feature Description	SmartAMPLET™ POP1021	SmartAMPLET™ POP1021T	SmartAMPLET™ POP1021C	SmartGAIN™ POP1021C
Number of Amplifier	1	2	1	1
Pump Laser	Uncooled pump	Uncooled pump	Cooled pump	Cooled pump
Footprint	90 x 70 x 15 (mm)			
Maximum Optical Output	Up to 22dBm	Up to 20dBm for each	Up to 24dBm	Up to 22dBm
Communication	RS232 LVTTTL level (3.3V)			
Power Supply	3.3V (5V Optional)			
Control Modes	AGC, APC or ACC			
Gain Flatness	±0.5dB typ. For fixed gain			±0.5dB typ. For variable gain
Transient Suppression	Optional for multi-channel application with GFF			
Firmware Field Upgrade	Remote, hitless			
Operating Temperature	-10 to 65°C ambient (70°C Case)			
Electrical Connector	ZLTTMM-115-73-S-D by Samtec			

## Specifications

Parameter		Min.	Typ.	Max.	Unit
Wavelength Range(Custom)	C-Band	1527		1567	nm
	L-Band	1570		1608	nm
Maximum Output Power	SmartAMPLET™ POP1021C			24	dBm
	SmartGAIN™ POP1021C			22	dBm
	SmartAMPLET™ POP1021T			20	dBm
	SmartAMPLET™ POP1021			22	dBm
Small Signal Gain at -25dBm Input		25	30		dB
Gain Flatness at Specified Gain			±0.5	±1.0	dB
Variable Gain Range Signal-spontaneous Noise Figure, for G > 20dB			5.0	5.5	dB
Optical Return Loss (at Input and Output Ports)		25			dB
Polarization Mode Dispersion			0.3	0.5	ps
Polarization Dependent Gain			±0.2	±0.5	dB
Signal Input & Output Detection Dynamic Range		25	30		dB
Signal Detection Accuracy (Within the Range)			±0.3	±0.5	dB
Transient Overshoot (15 dB Drop)			0.5	1	dB
Transient Settling Time				1	ms
Electrical Connector	30 PIN (ZLTMM-115-73-S-D)				
Dimensions (H x W x D) without heatsink	90 x 70 x 15 (mm)				

## Operating Environment

Parameter		Min.	Typ.	Max.	Unit
Operating Temperature		-5		70	°C
Operating Relative Humidity		5		85	%RH
Power Supply Voltage	Default	3.0	3.3	3.6	Volt
	Optional	4.75	5.0	5.25	Volt
Power Supply Current				2.5	A
Control	RS232				

## Electrical Specifications for I/O PINs

Parameter	Min	Max	Unit	Note
Output High Voltage	3.2		Volt	10uA source current
	2.6		Volt	3mA source current
Output Low Voltage		0.1	Volt	10uA sink current
		0.6	Volt	3mA sink current
Input High Voltage	2.33	5.25	Volt	
Input Low Voltage	0	0.98	Volt	

## POP1021C-VGOA

### Features:

- Variable flattened gain
- Output tilt controlled
- Transient suppressed
- Up to 21dBm output power

## POP1021T Features:

- Same or different 2 amps in 1 housing
- Separately controlled
- Support flattened gain amp
- Up to 20dBm output for each amp

## Management

### Features:

- Serial RS232
- Automatic Control
- Default operating conditions, or user settable
- Software & hardware Alarms

## Applications

- 40G Optical transport or switching system
- Optical power budget booster
- Booster and Pre-amplifier into one module
- Single wavelength or multi wavelength operation



## Pin Assignments for POP1021(C)

Pin no.	Function	Pin no.	Function
1	+3.3 V	2	+3.3 V
3	+3.3 V	4	+3.3 V
5	Ground	6	Ground
7	Serial Input LVTTTL ( <b>Idle High</b> )	8	Serial Output LVTTTL ( <b>Idle High</b> )
9	Ground	10	Ground
11	NC	12	RESET Input ( <b>Active Low</b> )
13	Amplet Disable Input( <b>Active High</b> )	14	Output Power Mute Input ( <b>Active high</b> )
15	Case Temperature Alarm ( <b>Active High</b> )	16	Common Alarm ( <b>Active High</b> )
17	Pump Temperature Alarm ( <b>Active High</b> ) (Only for POP1021C)	18	Pump Bias Alarm ( <b>Active High</b> )
19	Loss of Input Alarm ( <b>Active High</b> )	20	Loss of Output Alarm/Mute Alarm ( <b>Active High</b> )
21	Input Power Monitor Ground	22	Output Power Monitor Ground
23	Analog Input Power Monitor	24	Analog Output Power Monitor
25	Ground	26	Ground
27	+3.3 V	28	+3.3 V
29	+3.3 V	30	+3.3 V

## Pin Assignments for POP1021T

Pin no.	Function	Pin no.	Function
1	+3.3 V	16	Common Alarm
2	+3.3 V	17	Loss of Input Alarm for BA
3	+3.3 V	18	Pump Bias Alarm
4	+3.3 V	19	Output Power Mute Input for PA
5	Ground	20	Disable Input for PA
6	Ground	21	Ground
7	Serial Input LVTTTL	22	Ground
8	Serial Output LVTTTL	23	Loss of Output Alarm/Mute Alarm for PA
9	Ground	24	Loss of Input Alarm for PA
10	Ground	25	Ground
11	Loss of Output Alarm/Mute Alarm for BA	26	Ground
12	RESET Input	27	+3.3 V
13	Disable Input for BA	28	+3.3 V
14	Output Power Mute Input for BA	29	+3.3 V
15	Case Temperature Alarm	30	+3.3 V

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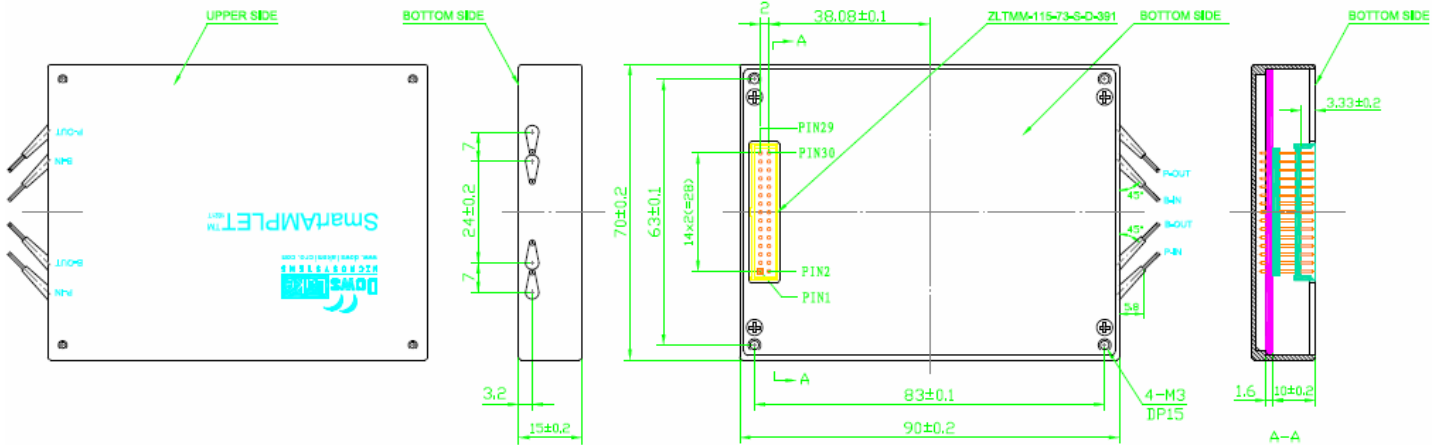
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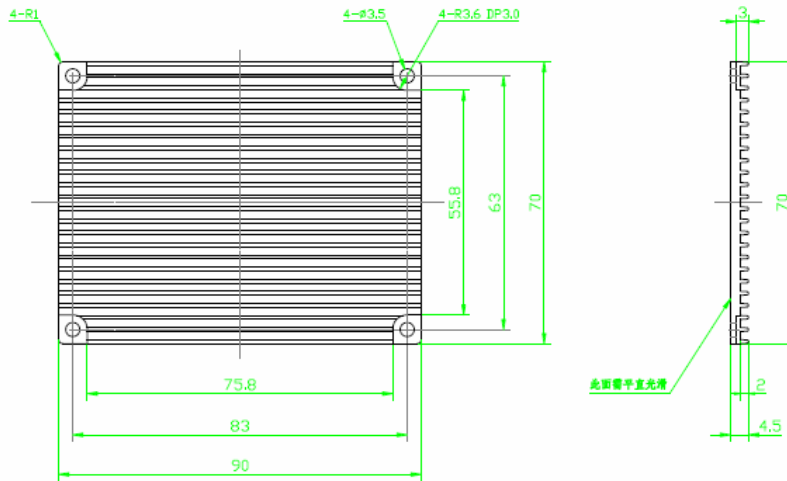
# POP1021 SmartAMPLET™ and POP1021 SmartGAIN™

MSA Size EDFA

## Mechanical Drawing for POP1021(C)(T)



### Optional Heatsink



### Ordering Information

#### POP1021T -

Typical Gain Setting 1

O - Single Channel

W - Multi-channel

Type 1	
B	Booster
L	Line
P	Preamp

Maximum Output Power 1

Typical Gain Setting 2

O - Single channel

Type 2	
B	Booster
L	Line
P	Preamp

Maximum Output Power 2

Optical Connector

FP	FC/PC
FA	FC/APC
SP	SC/PC
SA	SC/APC
LP	LC/PC
LA	LC/APC
E2	E2000
F3	F3000

Band

C	C-Band
L	L-Band
R	Red Band
B	Blue Band

#### POP1021(C)-

Typical Gain Setting

GFF Option

O	Single Channel - No GFF
W	Multi-channel - with GFF

Type	
B	Booster
L	Line
P	Preamp
V	Variable Gain

Maximum Output Power

Optical Connector

FP	FC/PC
FA	FC/APC
SP	SC/PC
SA	SC/APC
LP	LC/PC
LA	LC/APC
E2	E2000
F3	F3000

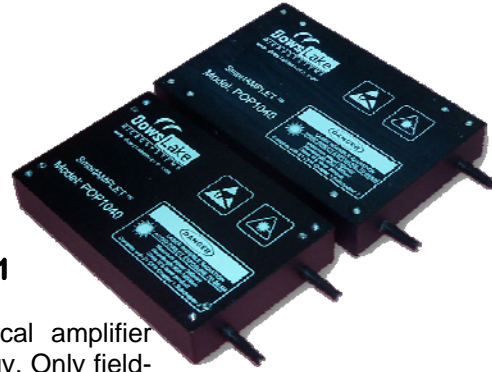
Band

C	C-Band
L	L-Band
R	Red Band
B	Blue Band





- | Miniature Optical Amplifier Optimized for 40G
- | Intelligent Electronic Control Built-in
- | Fast Transient Suppression for Receiver Protection
- | Optimized for Gain and Noise Figure as Pre-Amp
- | Redesigned from Field Proven Reliable Model POP1021



SmartAMPLET™ is a low-power, low-cost, self-controlled optical amplifier based on advanced digital electronics and fiber amplifier technology. Only field-proven optical components are used, is available with different saturation power level.

**Small:** About half the size of MSA type, Dowslake SmartAMPLET model POP1040 has a footprint smaller than a credit card. It connects easily to any hosting board without compromising the space.

**As easy as "Plug-N-Play":** Highly integrated, with on-board microprocessor, flash memory and software, SmartAMPLET™ is ready to go for your service without any need for additional electronic drive circuits.

**Optimized for 40G Application:** Special electronic circuit and firmware is implemented in order to provide fast transient suppression to protect receivers in a sudden input loss situation. This is especially useful for high data rate applications such as 40G.

**Hardware Features:**

- Ultra-Compact
- Hot Pluggable
- Board Mount
- < 1W Power Consumption

**Management Features:**

- Serial RS232
- Automatic Control
- Default operating conditions, or user settable
- Software & hardware Alarms

**Applications**

- 40G Optical transport or switching system
- Optical power budget booster
- Can be used as pre-amp or booster amp
- Single wavelength operation

## Optical Specifications

Parameter	Min	Max	Unit	Note
Wavelength Range(Custom)	1527	1567	nm	
	1570	1608	nm	
Saturation Power		20	dBm	
Typical Gain	10	30	dB	
Noise Figure		5.5	dB	At Gain>20dB
PMD		0.5	ps	

## Mechanical Specifications

Parameter	
Electrical Connector	16 PIN ZLTMM-108
Optical Interface	LC/UPC or User Specified
Dimensions (H x W x D)	75 x 50 x 12 (mm). See Mechanical Drawing for POP1040



### Absolute Maximum Rating

Parameter	Min	Max	Unit
Storage Temperature	-40	+85	°C
Storage Relative Humidity	5	95	%RH
Supply Voltage	-0.3	4.2	Volt
I/O Input Voltage	-0.3	5.8	Volt
I/O Sunk Current		50	mA
I/O Sourced Current		50	mA
Input Optical Power		15	dBm

### Operating Environment

Parameter	Min	Max	Unit
Operating Temperature	0	+65	°C
Operating Relative Humidity	5	85	%RH
Power Supply Voltage	3.13	3.47	Volt
Power Supply Current		500	mA

### Electrical Specifications for I/O PINs

Parameter	Min	Max	Unit	Note
Output High Voltage	3.2		Volt	10uA source current
	2.6		Volt	3mA source current
Output Low Voltage		0.1	Volt	10uA sink current
		0.6	Volt	8.5mA sink current
Input High Voltage	2.31	3.3	Volt	
Input Low Voltage	0	0.99	Volt	
Input Current		10	uA	
Input Capacitance		5	pF	

### Pin Assignments

Pin	Function	Pin	Function
1	+3.3 V	2	Ground
3	Ground	4	Output Power Mute Input (Active High)
5	Serial Input LVTTTL (Idle High)	6	Serial Output LVTTTL (Idle High)
7	Loss of Input Alarm (Active High)	8	Loss of Output Alarm/Mute Alarm (Active High)
9	Common Alarm (Active High)	10	RESET Input (Active Low)
11	Module Case/PUMP Case Temperature Alarm (Active High)	12	Pumps Bias Alarm (Active High)
13	Disable Input (Active High)	14	Ground
15	Ground	16	+3.3 V

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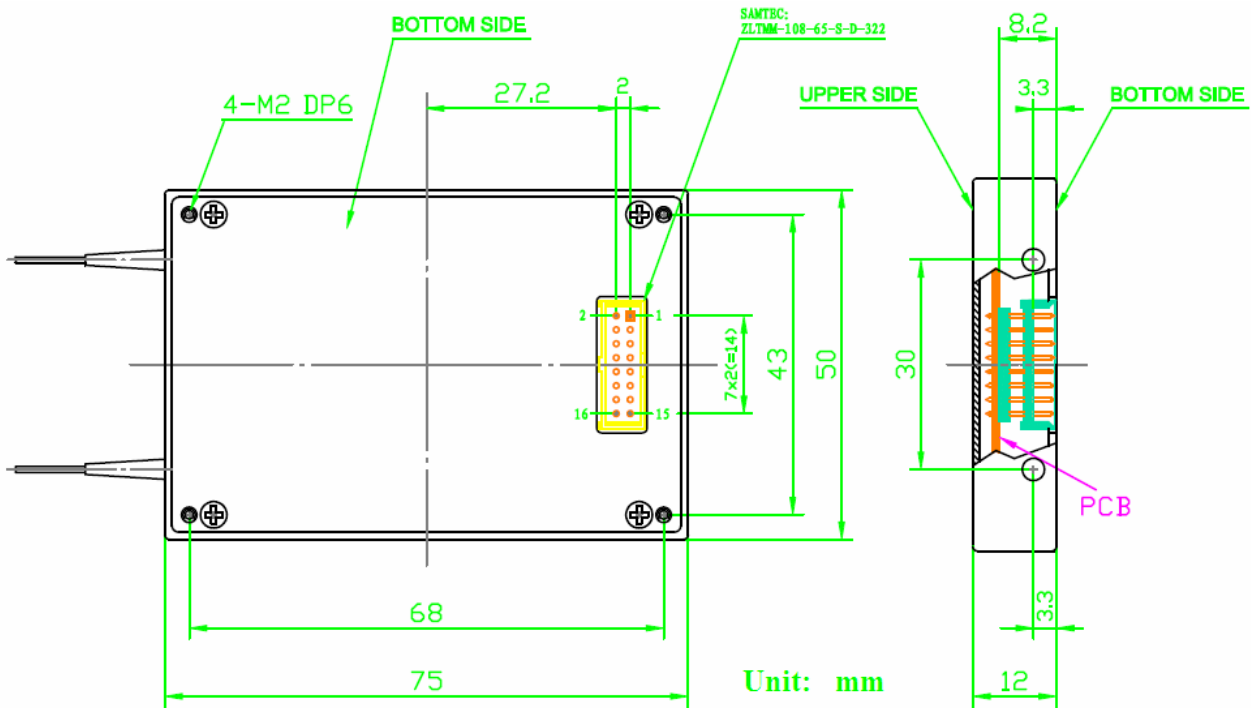
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## Mechanical Drawing for POP1040



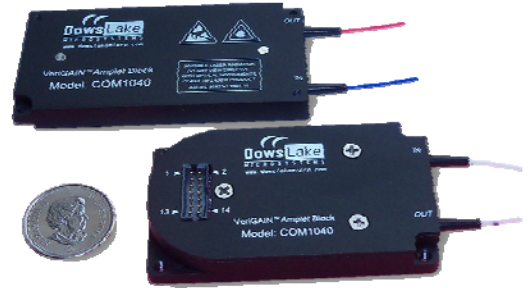
# COM1040 VeriGAIN™ Amplet Block

COM1040 VeriGAIN™ series amplet block is a low power, low cost, ultra-compact amplifier based on the uncooled 980 nm pump laser and erbium doped fiber. Only standard and field proven components are used, ensuring long term reliability.

**Tiny:** Small footprint and ultra-slim profile are the key characteristics of VeriGAIN™ series amplet block products.

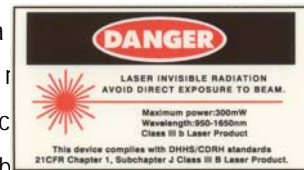
**Customizable:** Dowslake VeriGAIN™ amplet block can be customized for different application. Optical performance can be optimized based on individual requirement.

**No Electronic Driver:** Customer who chooses COM1040 shall provide pump laser control and output control circuits. Dowslake however can provide controlled version through SmartAMPLET™ POP1040.



## LASER SAFETY

This product complies with 21 CFR 1040.10 and 1040.11 as a laser product. Invisible laser radiation is emitted from the end of the connector. Avoid direct exposure to the beam.



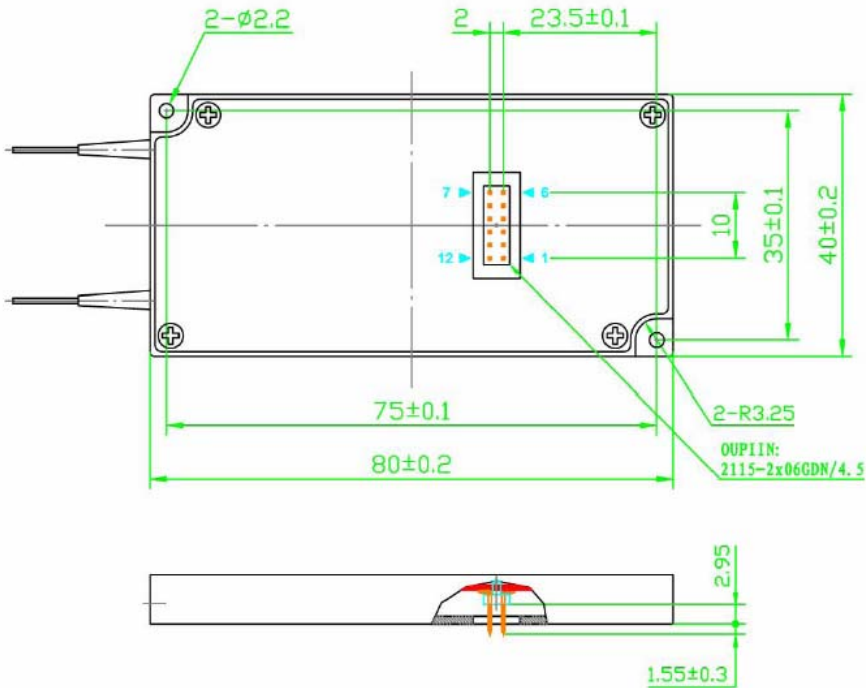
## Optical Specifications

Parameter	Min	Max	Unit	Note
Wavelength Range(Custom)	1527	1567	nm	C-band
	1570	1608	nm	L-band
Saturation Power		18	dBm	
Typical Gain	10	30	dB	
Noise Figure		5.5	dB	At Gain > 20dB
PMD		0.5	ps	
PDG		0.5	dB	
Operating Temperature	0	+65	°C	
Operating Relative Humidity	5	85	%RH	
Power Supply Voltage	3.13	3.47	Volt	
Power Supply Current		500	mA	
Electrical Connector	12 or 14 PIN			
Optical Interface	LC/UPC or User Specified			
Dimensions (H x W x D)	80 x 40 x 7.5 (mm).			
	See Mechanical Drawing for COM1040-S 70 x 40 x 10 (mm).			

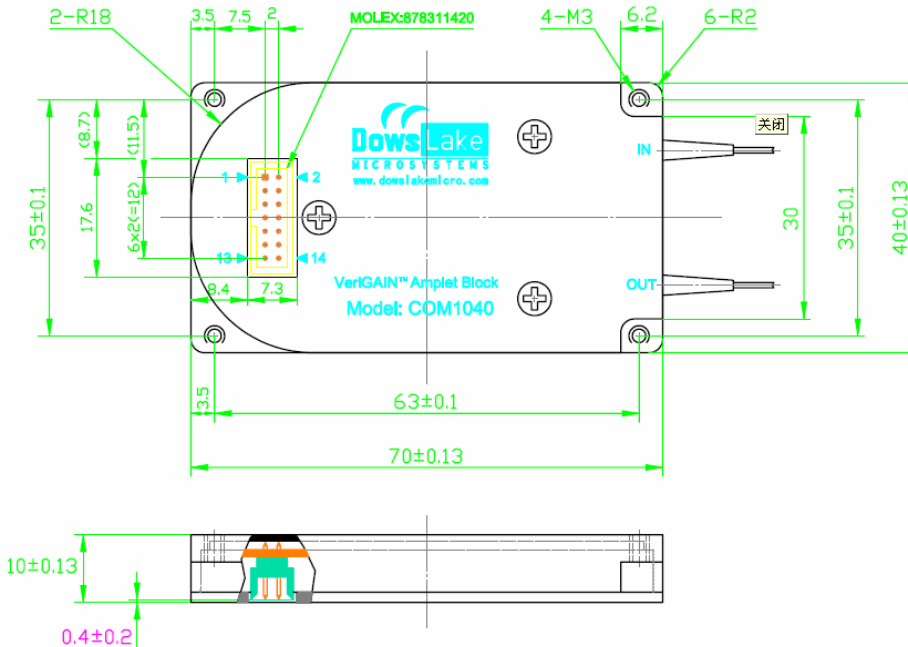


# COM1040 VeriGAIN™ Amplet Block

## Mechanical Drawing for COM1040-S



## Mechanical Drawing for COM1040-R



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- Low noise figure
- Input and Output monitoring taps
- Mid-stage option for compensation DCM or OADM
- Gain flattened for C and L band DWDM application
- 110-230VAC power input, single power supplier
- Hot pluggable in Standard 1U 19', with fan in the chassis
- Managed by RS232 CLI.



## Technical Information

Main Features			
Wavelength Range (customizable)	C band: 1527 to 1567nm; Or L band: 1570 to 1608nm		
Gain Flatness(for C band DWDM application )	+/-0.5dB(typical)		
Input/Output Dynamic Range	25dB min, 35dB max		
Optical Return Loss	>=30dB		
Polarization Mode Dispersion	0.3ps(typical)		
Polarization Dependent gain	+/-0.2dB(typical))		
Common Features	Booster	Inline	Pre-amplifier
Minimum Input (dBm)	-20	-30	-40
Maximum Input (dBm)	Maximum Output-Specified Gain		
Minimum Output (dBm)	Minimum Input+Specified Gain		
Maximum Output (dBm)	<=22	<=22	<=13
Gain (dB, optimum)	5~20	10~35	10~35
Noise Figure (typical, dB)	6	5	4.5
Mid-stage Loss(optional)	From 3 to 12 dB customizable		
Operating Conditions			
Operating Temperature	-5 to 55 °C		
Operating Humidity	5 to 95%(non-condensing)		
Storage Temperature	-40 to +70°C		
Dimension (H x W x D)	39×144×267 mm		
Max power consumption	15W		
Host chassis	Standalone chassis, one Hot pluggable EDFA card, input voltage 110-230VAC, with fan in the chassis		

Note: above optical technical information is general for all kinds of COAT.

Customer can contact Dowslake for detail EDFA optical information





- Intelligent Electronic Control Built-in
- Output monitoring
- High Output Power
- Spectrum Flattened for C or L or C+L band application
- Sizes could be choose



SmartAMPLET™ broadband source (BBS) is a custom configuration based on Dowslake’s SmartAMPLET™ amplification products. It provides a high power amplified spontaneous emission (ASE) source.

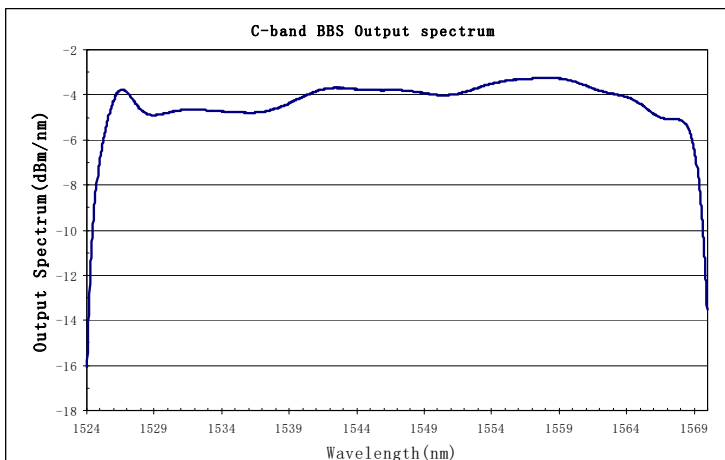
Compared to the SmartAMPLET™ gain compensator, the BBS has a terminated input port and the optical path is re-optimized in order to provide a strong ASE light.

## Technical Information

Main Features	
Wavelength Range (customizable)	C band: 1527 to 1567nm; Or L band: 1570 to 1608nm
Output Power (customizable)	20dBm
Spectrum Flatness (customizable)	2dB
Operating Conditions	
Operating Temperature	-5 to 65 °C
Operating Humidity	5 to 95%(non-condensing)
Storage Temperature	-40 to +85°C
Dimensions (customizable)	Same as POP1040/POP1021/POP1025/COAT-RA

Note: above optical technical information is general.

Customer can contact Dowslake for detail optical information




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